

NOTES ON SALVIA (LABIATAE) IN MEXICO,
WITH THREE NEW SPECIES

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THE GENUS *Salvia* L., well known to horticulturists, is an outstanding member of the Mexican flora. With its bright red, blue, sometimes yellow, or occasionally white flowers, it is a very conspicuous element in the highlands of Mexico. The flowers range in length from ca. 8 mm (*S. hispanica*) to 6 cm (*S. fulgens*). Common pollinators are hummingbirds, bees, and butterflies. A very high percentage of species are perennials; there are very few annual species of *Salvia* in Mexico.

Standley and Williams (1973) estimated that the genus consists of over 900 species, with nearly 500 from the Americas. Fernald's (1900) synopsis of the Mexican and Central American species of *Salvia* updated Bentham's (1848) and Hemsley's (1882) accounts. Bentham recognized 118 species, Hemsley 126, and Fernald 217.

Epling (1939), perhaps the most distinguished student of the genus, recognized 233 species for Mexico (all belonging to subg. CALOPHACE (Bentham) Epling). Twenty sections and 200 species are endemic to Mexico. In a subsequent series of supplementary notes (1940, 1951, 1957, 1962), he described several more species.

The increase in botanical activity in Mexico during the last few years has resulted in many new specimens that were not available to earlier botanists. I have studied the specimens of *Salvia* among these collections, along with the very rich holdings of the genus in the Gray Herbarium, Harvard University. This is the first report resulting from my study.

It now seems certain that over 275 species of *Salvia* (30 percent of the genus) occur in Mexico; of these, 88 percent (over 26.7 percent of the genus) are endemic to Mexico. Mexico has indeed been a primary center of speciation for *Salvia*.

Three new species are described here. A commentary on *Salvia tubifera* is also provided.

***Salvia anastomosans* Ramamoorthy, sp. nov.**

FIGURE 1.

Caulis pilis ramosis adpressis gerens. Foliorum laminae 1.5–3.7 cm longae, 0.5–1 cm latae, oblongae, ad extremos rotundatae, supra glabrae, subtus adpresse albo-tomentosae; venae anastomosantes. Calyx albo-tomentosus, ca. 7.5 mm longus, ca. 3 mm latus. Corolla azurea, ca. 1.2 cm longa.

Erect perennial shrub to 2 m tall, profusely branched. Stem terete, appressed



FIGURE 1. *Salvia anastomosans* (from holotype): a, habit; b, leaf; c, flower; d, dissected corolla.

white-tomentose with branched hairs when young, becoming glabrous with age. Petiole 0.5–1 cm long, appressed white-tomentose with branched hairs; leaf blade oblong, 1.5–3.7 by 0.5–1 cm, rounded at both ends, entire, glabrous above, appressed white-tomentose beneath with branched hairs, the midrib pronounced, especially beneath, with 9 to 12 pairs of lateral veins, secondary veins numerous and anastomosing into fine network very pronounced against white pubescence. Inflorescences axillary and terminal racemes of interrupted verticils, the internodes separating verticils 0.5–1 cm long, appressed white-tomentose with branched hairs; bracts small, inconspicuous, white-tomentose, early deciduous; pedicels 1–2 mm long, white-tomentose. Calyx ca. 7.5 by 3 mm, bearing numerous sessile glands, these covered by white tomentum of branched hairs, the upper lip entire, acuminate, the lower with 2 acuminate lobes; corolla ca. 1.2 cm long (tube 6 by 3 mm), blue, the upper lip nearly entire, obscurely emarginate, bearded above, as long as lower lip, the lower lip 3-lobed, with lateral lobes shorter and rounded, and middle lobe ca. 6 by 6 mm, broadly rounded, emarginate, undulate; stamens 2, included, filaments 2 mm long, connective ca. 4 mm long, anthers ca. 2 mm long; style ca. 1.4 cm long, slightly exceeding corolla, divided into 2 unequal arms, glabrous.

TYPE. Mexico, Oaxaca, Teposculula, above Tamazulapan (alt. 2250 m), "materral" with *Bursera*, tree *Ipomoea*, etc., Aug. 8, 1981, *D. Lorence et al.* 3709 (holotype, MEXU).

The specific epithet refers to the impressively anastomosing venation pattern that helps to distinguish the species immediately. *Salvia anastomosans* belongs to sect. TOMENTELLAE Epling and is related to *S. candicans*, which differs in having truncate leaf bases and less obvious venation.

***Salvia boegei* Ramamoorthy, sp. nov.**

FIGURE 2.

Petiolis 2–6 mm longis, prope basin articulatis, albo-villosis. Foliorum laminae 1–2.8 cm longae, 0.8–1.9 cm latae, ovatae, ad apicem acutae, ad basim truncatae vel subcordatae, supra puberulae, subtus ad nervos villosae. Verticilli fere capitati 2 cm lati. Calyx albo-lanosus. Corolla azurea, 2–2.1 cm longa, tubo papillato.

Erect perennial shrub or subshrub (height not known), profusely branched. Stem reddish, angled, white-tomentose to villous, glabrous with age. Petiole 0.2–0.6 cm long, articulated near base, white-villous; leaf blade ovate, 1–2.8 by 0.8–1.9 cm, acute at apex, truncate to subcordate at base, crenate-serrate at margin, puberulent above, appressed-villous along nerves beneath and with numerous sessile glands, lateral veins 3 to 5 pairs, secondary veins anastomosing. Inflorescences terminal racemes of interrupted verticils, the internodes separating verticils 1–2.5 cm long, white-villous, the verticils up to 2 cm across, many flowered, crowded into capitula; bracts ca. 5 by 3 mm, ovate, acuminate, early deciduous, villous on back; pedicels 2–3 mm long, white-woolly. Calyx ca. 6 by 4 mm, covered with dense, white wool (wool obscuring lobes), bilabiate, the upper lip entire, rounded, the lower obscurely 3-lobed, with lateral lobes

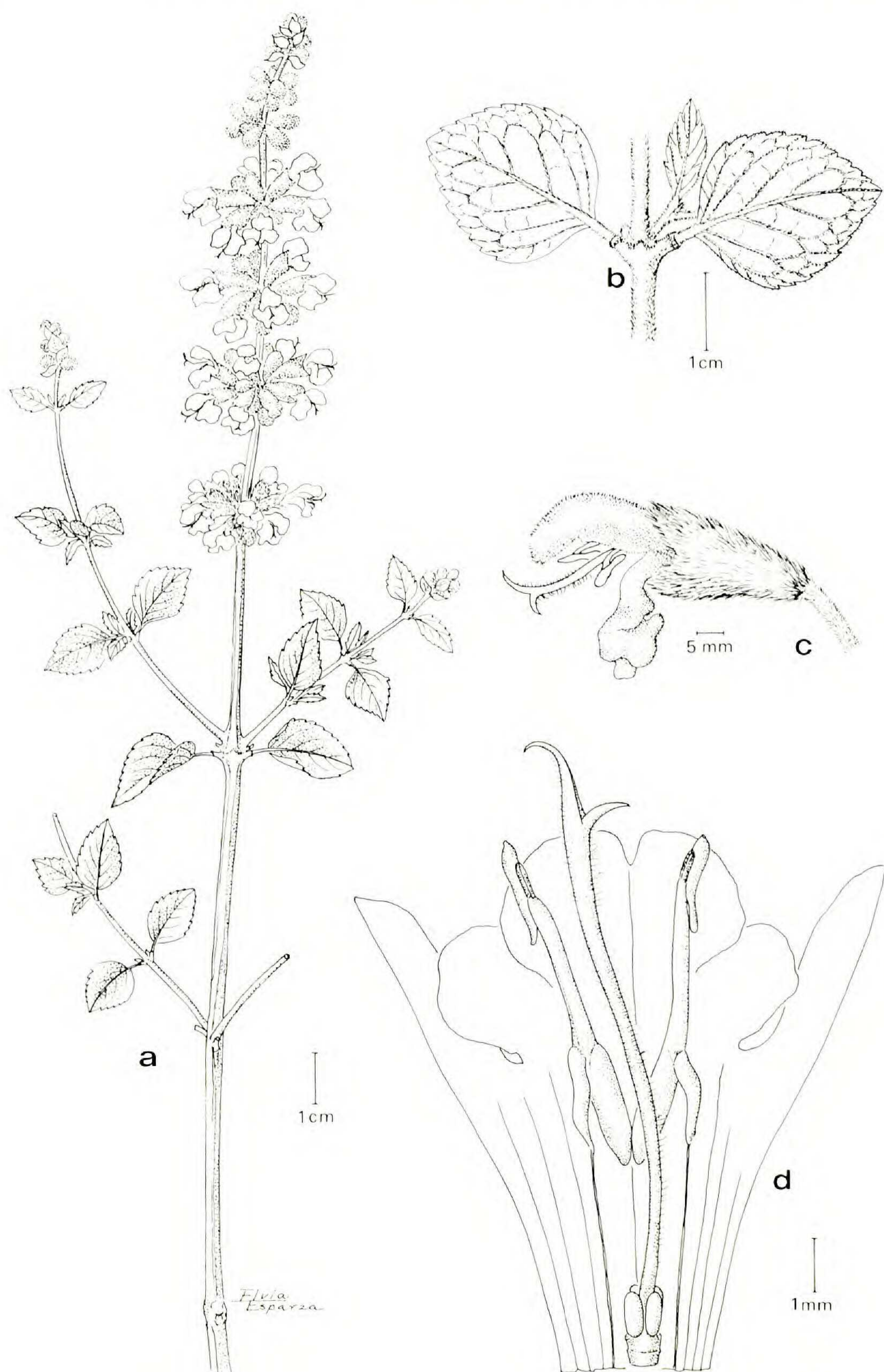


FIGURE 2. *Salvia boegei* (from holotype): a, habit; b, node with leaves; c, flower; d, dissected corolla.

shorter, all rounded; corolla 2–2.1 cm long (tube 6 mm long, with pair of papillae toward base on inside), blue, the upper lip 4.5 mm long, as long as lower, emarginate, bearded on back, bearing many sessile glands, these white when dry, the lower lip ca. 4.5 by 4.5 mm, villous on outside, bearing glands, 3-lobed, with lateral lobes shorter, middle lobe rounded and undulate; stamens 2, included, filaments ca. 2 mm long, connective ca. 3.5 mm long, anthers ca. 2 mm long; style 1.1–1.2 cm long, hairy, barely exerted, divided into 2 unequal arms.

TYPE. Mexico, Puebla, Puente de Dios Molcaxac (alt. 1800 m), with *Dasyllirion*, *Agave*, *Nolina*, *Yucca*, Sept. 16, 1971, *W. Boege* 1933 (holotype, MEXU).

This species is named after Mr. Wolfgang Boege, an inspiring teacher and plant collector, whose excellent personal herbarium is now with the National Herbarium of Mexico (MEXU). He died in Jalisco in 1975 while on a plant-collecting expedition.

Salvia boegei can be recognized immediately by its articulated petiole, almost capitate verticils, and woolly white calyx. It belongs to sect. *SCORODONIA* Epling and appears to be related to *S. breviflora*, which differs in having tardily deciduous bracts and leaves that are whitish beneath.

***Salvia rzedowskii* Ramamoorthy, sp. nov.**

FIGURE 3.

Caulis pilis albis reflexis obsitus. Folia crassa, 2–6 cm longa, 0.6–1.6 cm lata, elliptica, ad basin et ad apicem acuta, supra pilosa, subtus albo-lanata. Verticilli congesti. Calyx villosus, ca. 1.1 cm longus, 2.5 mm latus. Corolla alba, ca. 1.3 cm longa.

Erect, perennial, suffrutescent herb to 6 dm tall, branched. Stem 4-angled, sulcate, tomentose with white, reflexed hairs, pilose to glabrous with age. Petiole 1–3 mm long, villous; leaf blade thick, elliptic, 2–6 by 0.6–1.6 cm, acute at both ends, crenate-serrate at margin, pilose above, with 6 to 8 pairs of faint lateral veins, white-woolly below. Inflorescences terminal racemes of crowded verticils, internodes separating verticils not well pronounced; bracts small, ca. 1–2 cm by 4 mm, ovate, caudate-acuminate; pedicels 2–4 mm long, terete, villous, spreading at anthesis. Calyx villous, ca. 1.1 cm by 2.5 mm, bilabiate, the upper lip ovate, acuminate, entire, the lower with 2 ovate, acuminate lobes; corolla ca. 1.3 cm long (tube ca. 8 by 2.5 mm, glabrous), white, the upper lip 5 mm long, rounded and emarginate at tip, bearded, the lower lip ca. 6 by 6 mm, 3-lobed, with lateral lobes shorter and rounded, middle lobe undulate; stamens 2, included, filaments ca. 2.5 mm long, connective ca. 2 mm long, anther ca. 2 mm long; style ca. 1.2 cm long, hairy, divided into 2 unequal arms.

TYPE. Mexico, México, 5 km SW of Sultepec, on the road to Amatepec, mesophyllous forests (alt. 2350 m), February 18, 1979, *J. Rzedowski* 36071 (holotype, MEXU).

The specific epithet honors Dr. Jerzy Rzedowski, whose contribution to Mexican botany is well known.

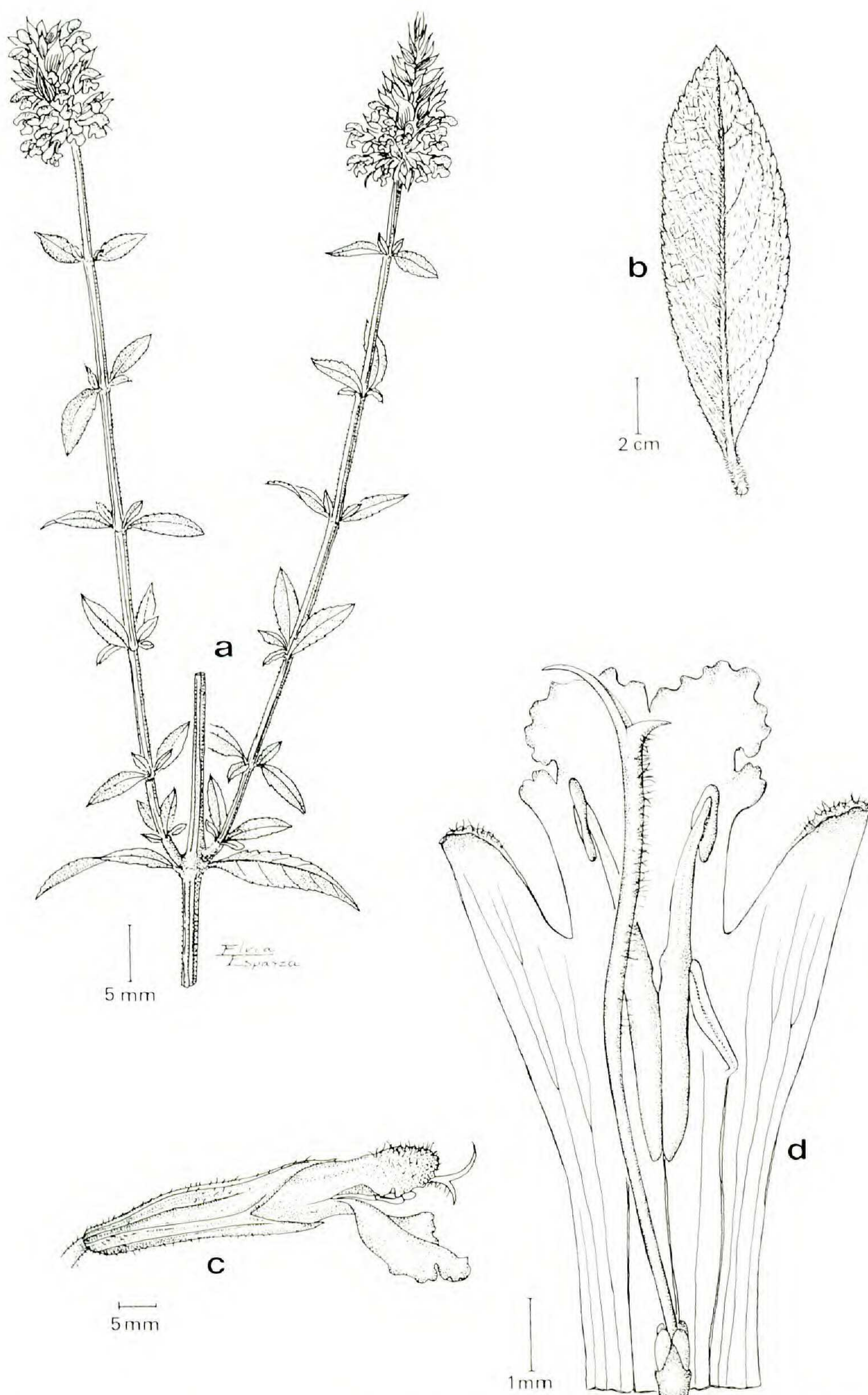


FIGURE 3. *Salvia rzedowskii* (from holotype): a, habit; b, leaf; c, flower; d, dissected corolla.

Salvia rzedowskii is easily recognized by its thick leaves that are white-woolly beneath, its condensed raceme (resembling a nearly cone-shaped head), its caudate-acuminate bracts, and its white flowers. White flowers in *Salvia* are rare, and the species may be moth pollinated. The affinities of this species are not clear.

SALVIA TUBIFERA, A LITTLE-KNOWN SPECIES

Cavanilles (1791) described *Salvia tubifera* from cultivated plants grown from seeds brought from Mexico. No exact locality for the original seed collection is known. Fernald (1900) included this species in his synopsis of Mexican and Central American salvias but did not cite any additional specimens. Epling assigned it to sect. TUBIFLORAE Epling and cited two specimens, one from Real del Monte, Hidalgo, Mexico, and the other from the central valley of Mexico. I have seen both. The species has been re-collected twice from near Real del Monte, in 1950 by Matuda and in 1982 by Benitez. Recent studies have shown that the species is, in fact, widespread and has been going by the names *S. excelsa* and *S. venosa*.

Salvia excelsa was described by Bentham from plants grown from seeds supposedly of Guatemalan origin. I have seen a photograph of the type, old collections in the Gray Herbarium (GH), and recent collections in the Herbario Nacional (MEXU) and the herbarium of the Escuela Nacional de Ciencias Biológicas (ENCB). These clearly match Cavanilles's plate of *S. tubifera* Cav. and the type photo of the species.

Salvia venosa, described by Fernald (1900), is based on a collection from near San Cristóbal las Casas in Chiapas, Mexico (*Nelson 3138* (GH, US)). Epling (1939) separated *S. venosa* and *S. excelsa* on geographic grounds (Chiapas vs. Guatemala) but later (1940) concluded that they were conspecific. I have seen the type material at GH and am of the same opinion. These plants that have been going by three different names represent only one species, for which the earliest name is *S. tubifera* Cav.

Complete specimen citation with synonymy and a description are provided here.

***Salvia tubifera* Cav.** Ic. Descr. Pl. **1**: 16. t. 25. 1791 (illustration and description of plants grown from seeds brought from Mexico). LECTOTYPE: we have recently received in MEXU photographs of types of all salvias in the collections at MA described by Cavanilles. There are two specimens labeled *S. tubifera*, and I designate the specimen with the annotation "*S. tubifera* Icon. t. 25" as lectotype. Epling did not typify the name in 1939.

Salvia longiflora Willd. Sp. Pl. **1**: 141. 1797, nom. superfl. TYPE: Willdenow cited a "specim. verum in herb. Jussieu vidi"; this may be considered as the type of his binomial.

Salvia excelsa Bentham, Bot. Gaz. **27**: 90. 1841. TYPE: description from plants grown from seeds brought from ?Guatemala (holotype, specimen in K, n.v., photo GH!).

Salvia venosa Fern. Proc. Amer. Acad. Arts **35**: 545. 1900. TYPE: Mexico, Chiapas, San Cristóbal las Casas, *Nelson 3138* (holotype, GH!; isotype, US!).

Herb or subshrub 0.5–1.2 dm tall, branched. Stem 4-angled, sulcate, villous when young, sparsely pilose to glabrous with age, the hairs multicellular, often crisped, usually appressed, often persisting along grooves. Petiole 2–5 cm long, villous, the hairs usually crisped; leaf blade ovate, sometimes nearly rotund-ovate, 4–12 by 2.5–7.1 cm, apex acute to acuminate, base broadly to narrowly cuneate to somewhat truncate, margin crenate-serrate, lateral veins 4 to 7 pairs, upper surface pilose to glabrescent, lower surface densely to moderately villous to nearly glabrescent and paler. Inflorescences terminal racemes of interrupted, 2- to 6-flowered verticils separated by internodes of 0.5–4 cm; bracts 4 mm–1.2 cm by 4–8 mm, broadly ovate, caudate-acuminate, pilose abaxially, early deciduous; pedicels 1.5–8 mm long, angled, villous. Calyx 8 mm–1.1 cm by 3–4 mm, pilose to glabrous above, usually villous to hispid below, bilabiate, upper lip entire, lower 2-lobed, all acuminate; corolla 2.6–3 cm long (tube 2.2–2.4 cm by 3–4 mm), scarlet, villous, the upper lip 5–6 mm long, longer than lower, rounded, emarginate, enclosing stamens and stigma, the lower lip 3–4 by 3–4 mm, 3-lobed, with lateral lobes shorter, middle lobe larger and rounded, all reflexed; stamens 2, the filaments 3 mm long, attached near base of corolla tube, the connective 2–2.2 cm long, the anthers 2.7 by 0.5 mm, acute at ends; style as long as corolla tube, pilose, ending in 2 unequal stigmatic lobes. Seeds not seen. Flowering July to November.

DISTRIBUTION. Nuevo León in northern Mexico (Epling (1951) cited *Meyer & Rogers 2891* from Nuevo León, but I have not seen it) through Hidalgo, Puebla, Guerrero, and western Veracruz to Chiapas and ?Guatemala in the southeast. Usually in pine/oak forests; 1800–2750 m alt.

SPECIMENS EXAMINED. **Mexico.** HIDALGO: Zimapán, between Zimapán and Jacala, Barranca de San Vicente, near km 238, *Moore & Wood 4435* (GH), *Moore & Wood 5065* (GH, MEXU); Real del Monte, *Matuda 18883* (MEXU); Zempoala, *Benitez 836* (ENCB, MEXU). PUEBLA: Puebla-Veracruz border, Cumbres de Aculcingo, *Boege 1953* (GH, MEXU). VERACRUZ: Puerto del Aire, *Rosas 802* (GH, MEXU); El Puerto, *Sharp 44703* (MEXU). GUERRERO: Omiltepec, *Halbinger s.n.*, November, 1975 (MEXU). CHIAPAS: San Cristóbal las Casas, *Breedlove 11903* (MEXU), *Ghiesbreght 749* (GH). Without definite locality,¹ *Coulter 1088, 1089* (GH).

This widespread but rare, moderate-sized, scarlet-flowered *Salvia* is one of the numerous attractive species in Mexico. Plants from Veracruz are glabrescent, those of Puebla and Hidalgo very pubescent, and those of Guerrero intermediate. The number of flowers is variable: plants from Hidalgo and Chiapas bear more than do those of Puebla, Veracruz, and Guerrero.

Epling (1939) classified *Salvia tubifera* Cav. (including *S. longiflora* Willd.) in sect. TUBIFLORAE Epling, and *S. venosa* and *S. excelsa* in sect. CURTIFLORAE

¹I do not know the definite localities for these two numbers. Fernald (1900) referred them to Zempoala in Hidalgo (Real del Monte is in Municipio Zempoala). Epling (1939), however, thought that one came from the Valley of Mexico, and the other from Real del Monte; he did not say which number was from where.

Epling. In general morphology *S. tubifera* resembles *S. nervata* Martens & Gal. of sect. CURTIFLORAE more than it does any members of sect. TUBIFLORAE.

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